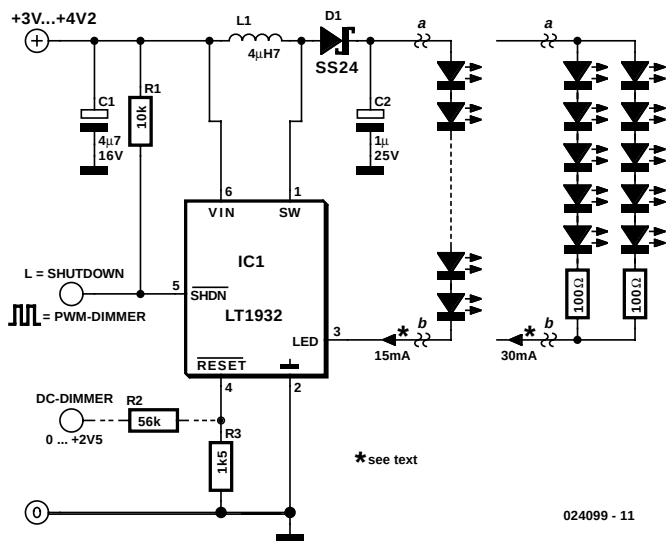


LED Flashlight

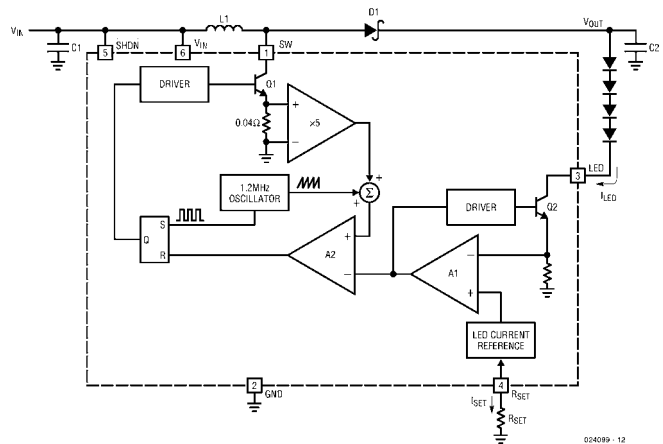
021



If you need to drive a number of white LEDs to provide display backlighting or for a white-light torch what's the best way to configure them? If they are wired in series then the forward conduction voltage of the chain will be greater than the output from a typical battery. Connect them in parallel and current becomes a problem. To keep the light output constant it is also necessary to maintain a constant current through the LEDs despite a falling battery voltage. The LT1932 from Linear Technology (www.linear-tech.com/pdf/1932f.pdf) is an efficient solution to the problem. This chip operates at a low supply voltage and contains a switched mode regulator circuit supplying an output current defined by an external resistor at the R_{SET} input. The 4.7 μ H inductor must be a type suitable for use in switched mode circuits; it stores energy in the ferrite cores magnetic field during switching.

Up to eight LEDs can be connected in series but if more are required it is possible to use two parallel networks of five series connected LEDs. In this configuration it is necessary to include a resistor in each arm of around 100 Ω to prevent one of the arms from hogging all the current. A pulse width modulated square wave applied to the Shut-down ($\overline{SHDN}$) input will dim the LEDs. Alternatively an external variable supply connected via a 56 k Ω resistor to the R_{SET} input can also act as a dimmer.

(024099-1)



Number of LEDs	Operating voltage	Efficiency	R_{SET}	I_{LED}
2	1.8 to 3.0 V	75 %	4k Ω 53	5 mA
3	1.8 to 3.0 V	75 %	2k Ω 26	10 mA
4	1.8 to 3.0 V	75 %	1k Ω 5	15 mA
5	2.0 to 3.0 V	70 %	1k Ω 13	20 mA
6	2.7 to 4.2 V	75 %	750 Ω	30 mA
8	3.0 to 4.2 V	70 %	562 Ω	40 mA
10 *	2.7 to 4.2 V	75 %		

* Two parallel arms of 5 LEDs connected in series together with a 100 Ω resistor